Colorado Ground Water Administration

Surface Water and Ground Water Interaction

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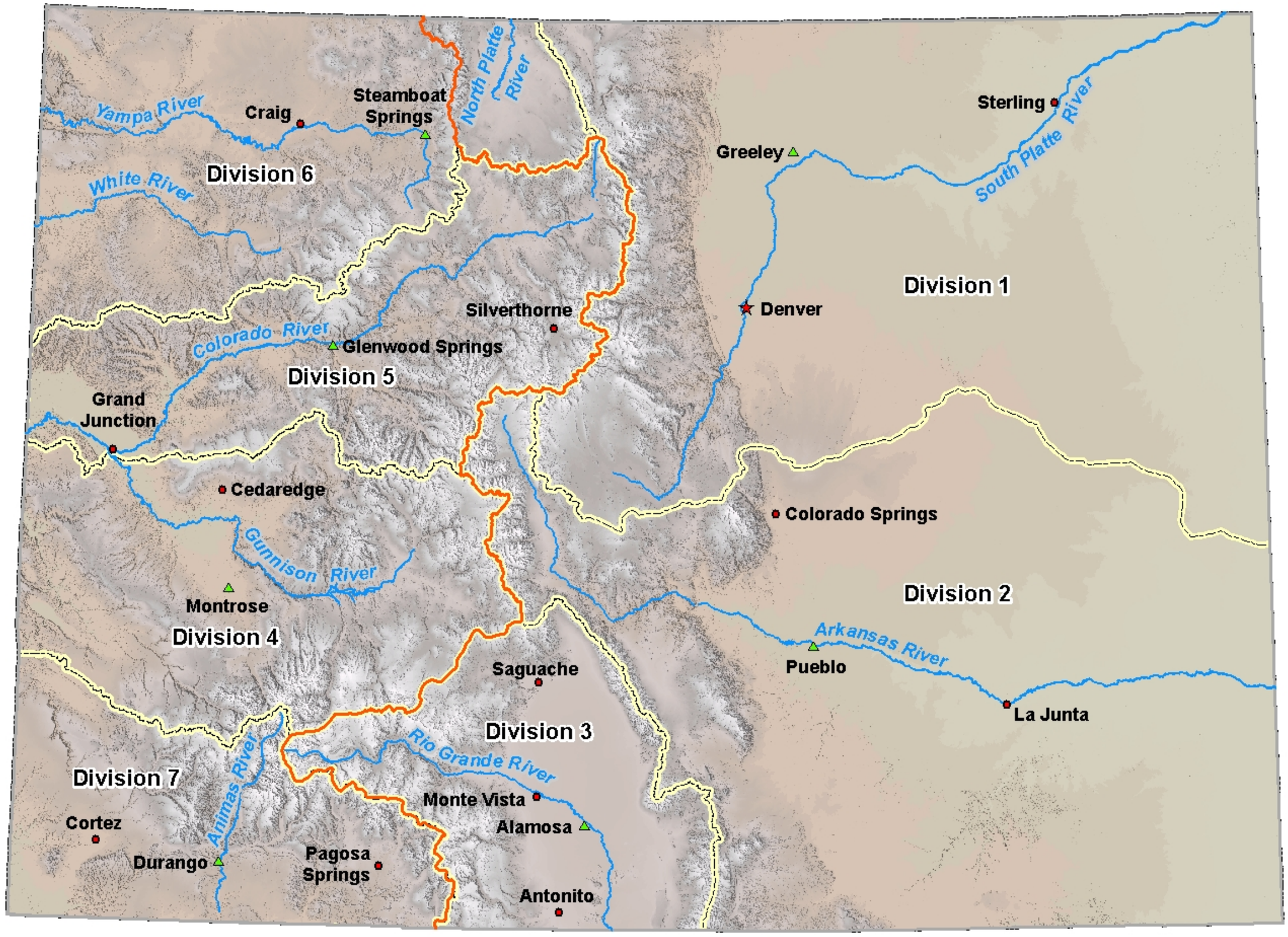

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Summary

- Colorado case law recognizes that pumping tributary ground water impacts surface water,
- When that impact occurs in an over-appropriated basin the depletion to the surface water is legally presumed to injure surface water rights,
- Colorado case law and statutory law require that pumping depletion be replaced by a substitute supply through a *plan for augmentation.*

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Summary

- When that impact occurs in an over-appropriated basin the depletion to the surface water is legally presumed to injure *surface water rights*,
    - Direct flow or Storage; Irrigation, Municipal, Commercial, Industrial, etc.
    - Instream Flow
    - Interstate Compact Obligations

Brief Administration History

- Ground water management formally became an Administrative issue in Colorado in the 1960's, but
- First consider early development in river basins
  - Surface water use developed pre-20th century, quickly causing over-appropriation
  - Ground water use developed mostly in 1930's through 1950's

Brief Administration History

- Surface water/ground water
  - Early 1900's court recognition of ground water interaction with surface water,
  - 1929, and then 1951, Colorado Supreme Court stated clearly that all ground water was assumed to be tributary to natural streams, absent proof to the contrary.

Brief Administration History

- Surface water/ground water
  - In 1965 and 1969, the Colorado General Assembly enacted comprehensive legislation,
  - Legal recognition of the connection between ground water and surface water,
  - Integrated ground water into the priority system
  - Introduced the concept of a ***Plan for augmentation*** (section 37-92-103(9), C.R.S.)

Ground Water Administration

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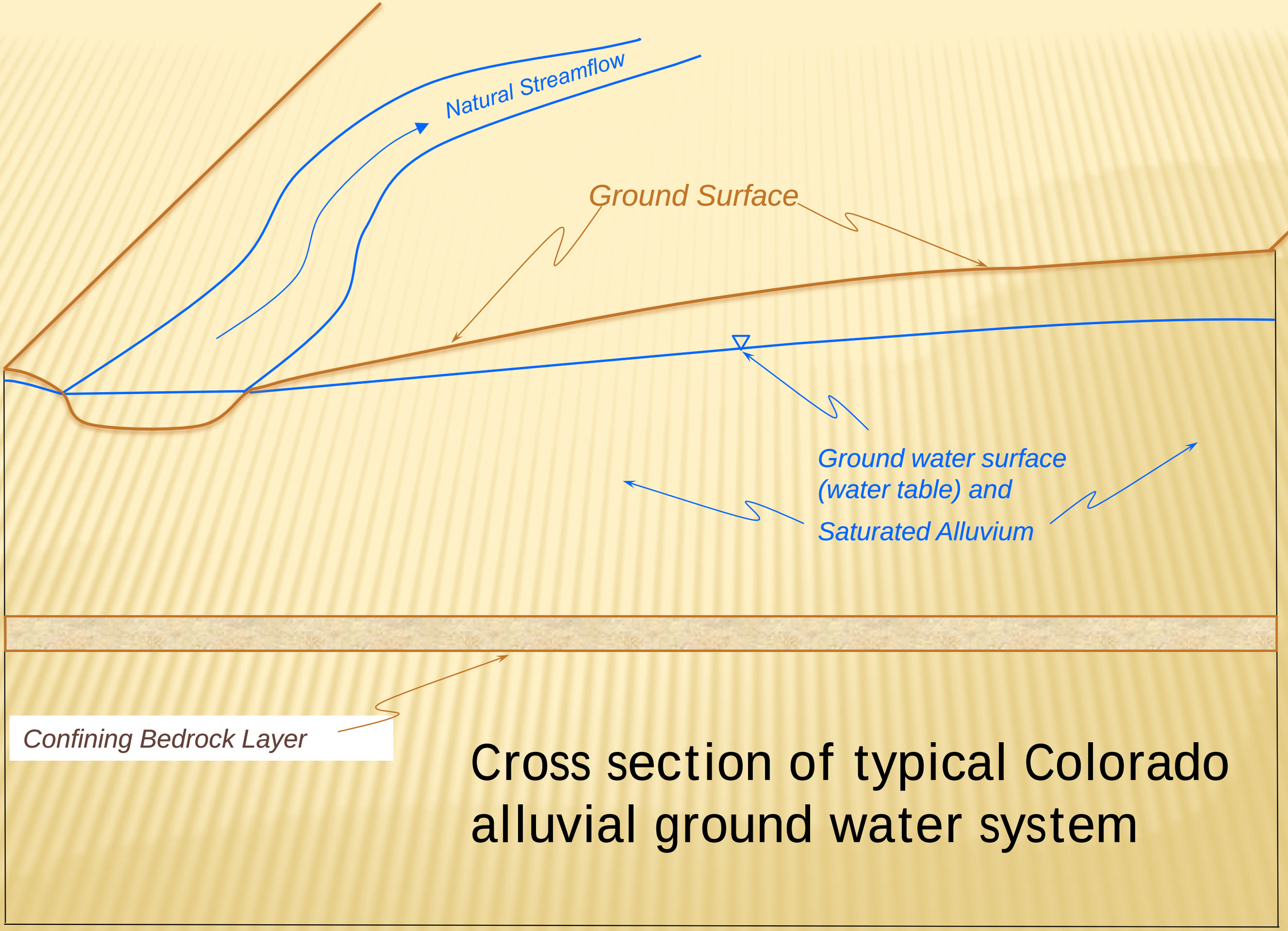
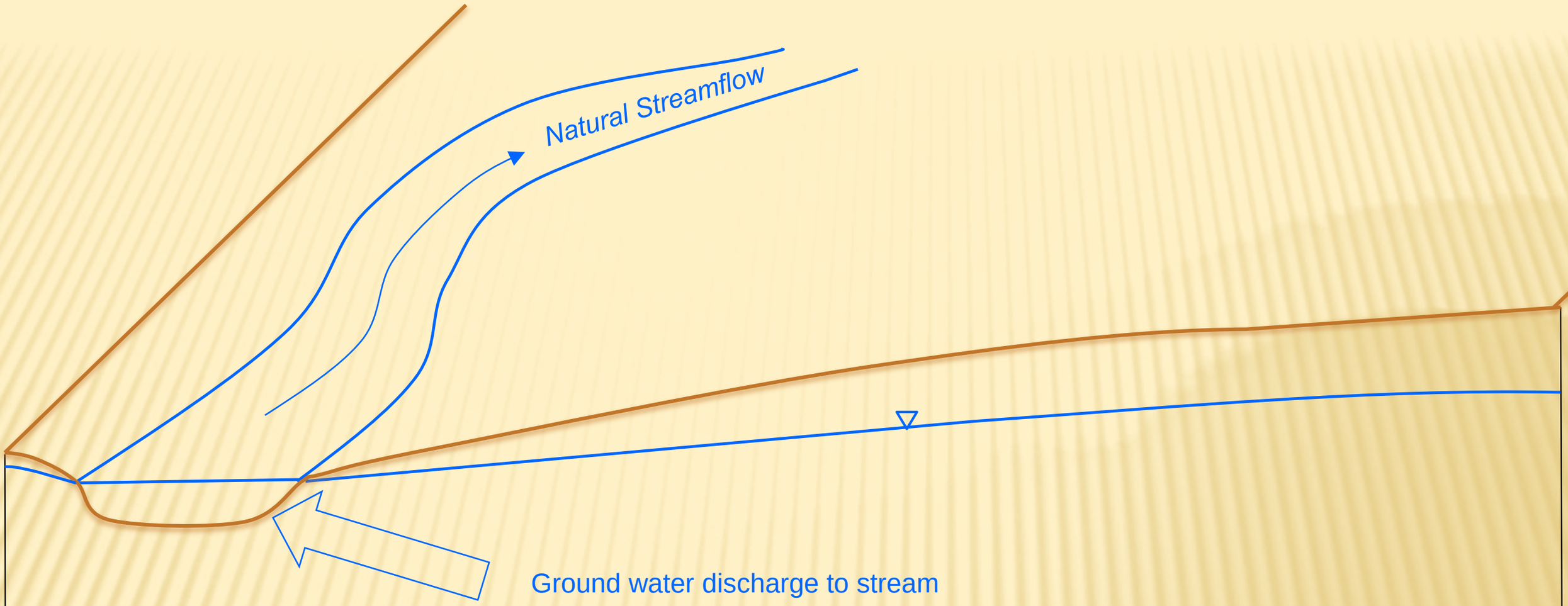
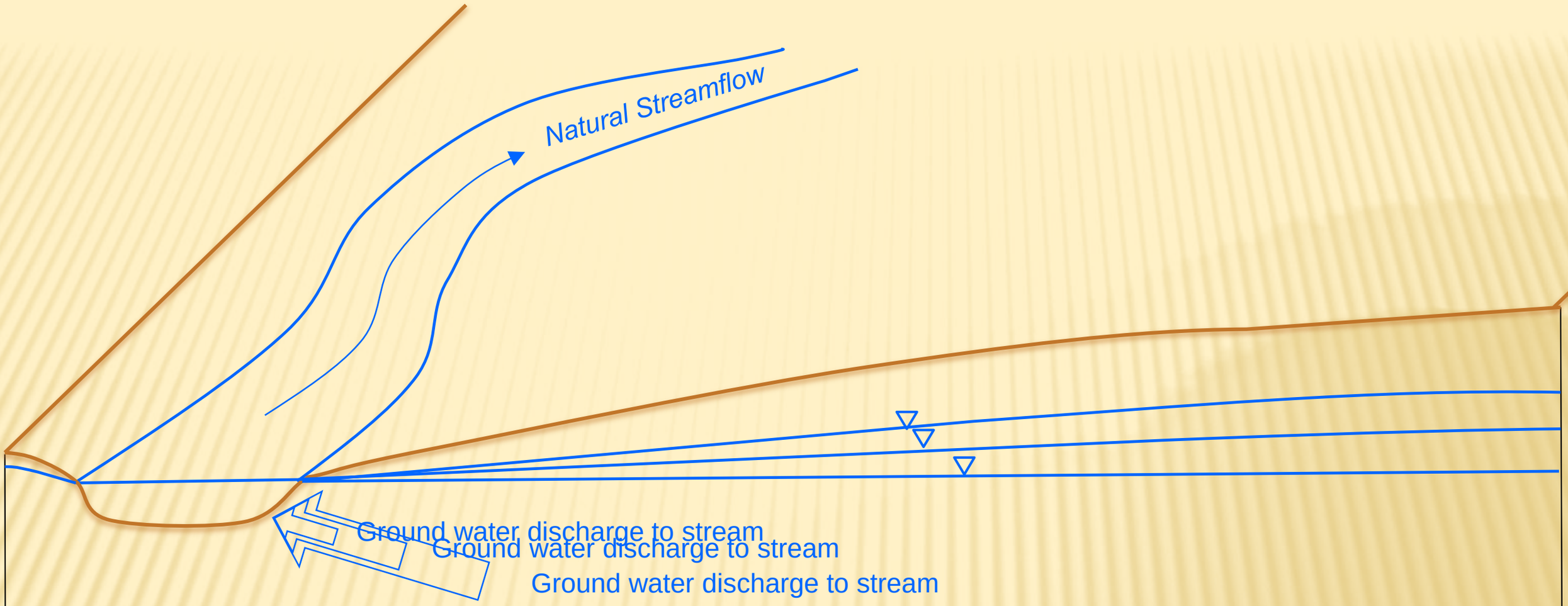


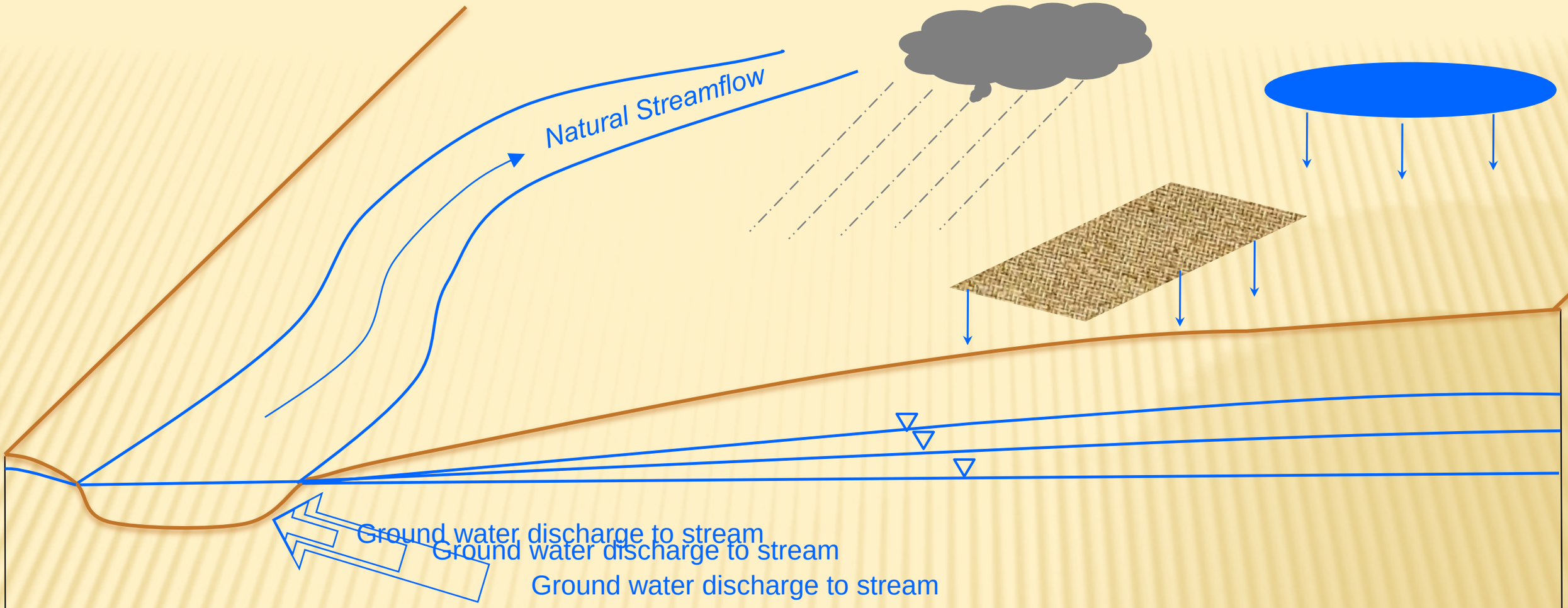
Cross section of typical Colorado alluvial ground water system



- Constant discharge to the stream
- Increases and decreases with hydraulic gradient



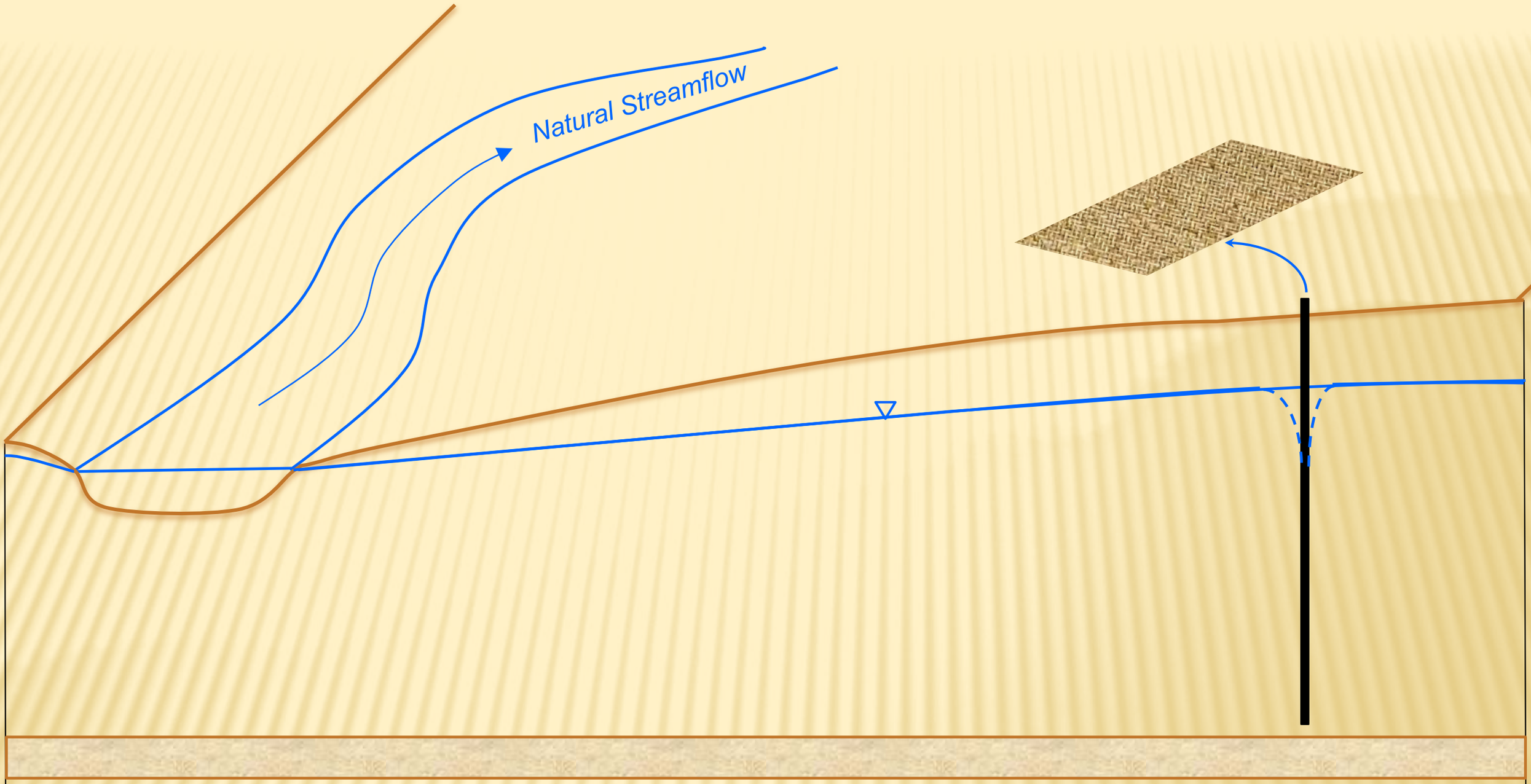
- Ground water/surface water equilibrium
- Discharge to stream would diminish and finally stop.



Constant discharge depleted the aquifer, however, due to influences like:

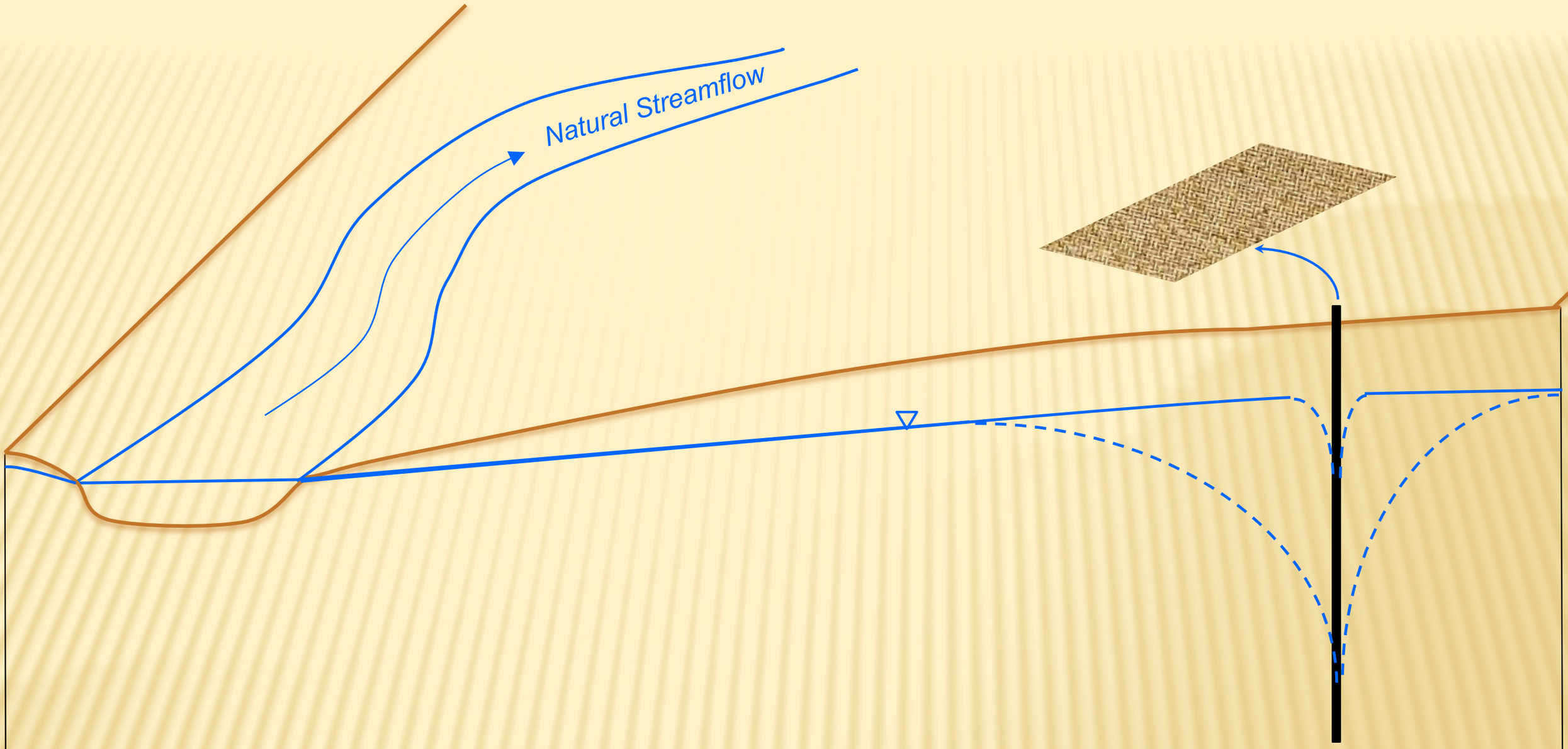
- Recharge from precipitation,
- ditch, pond, and reservoir seepage,
- and deep percolation from irrigation,

the water table remains,

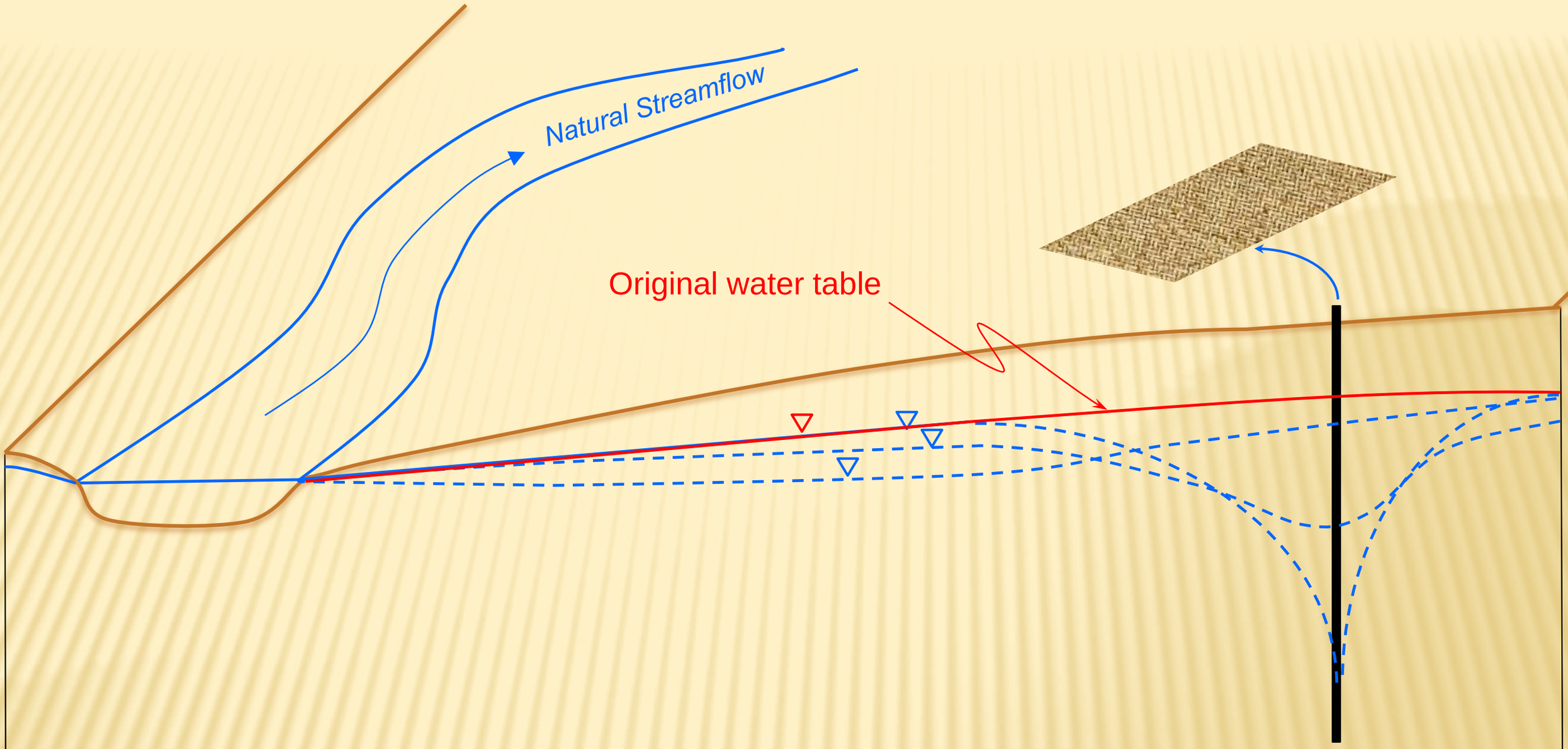


Now, consider an irrigation well at a distance from the stream.

- Pumping begins



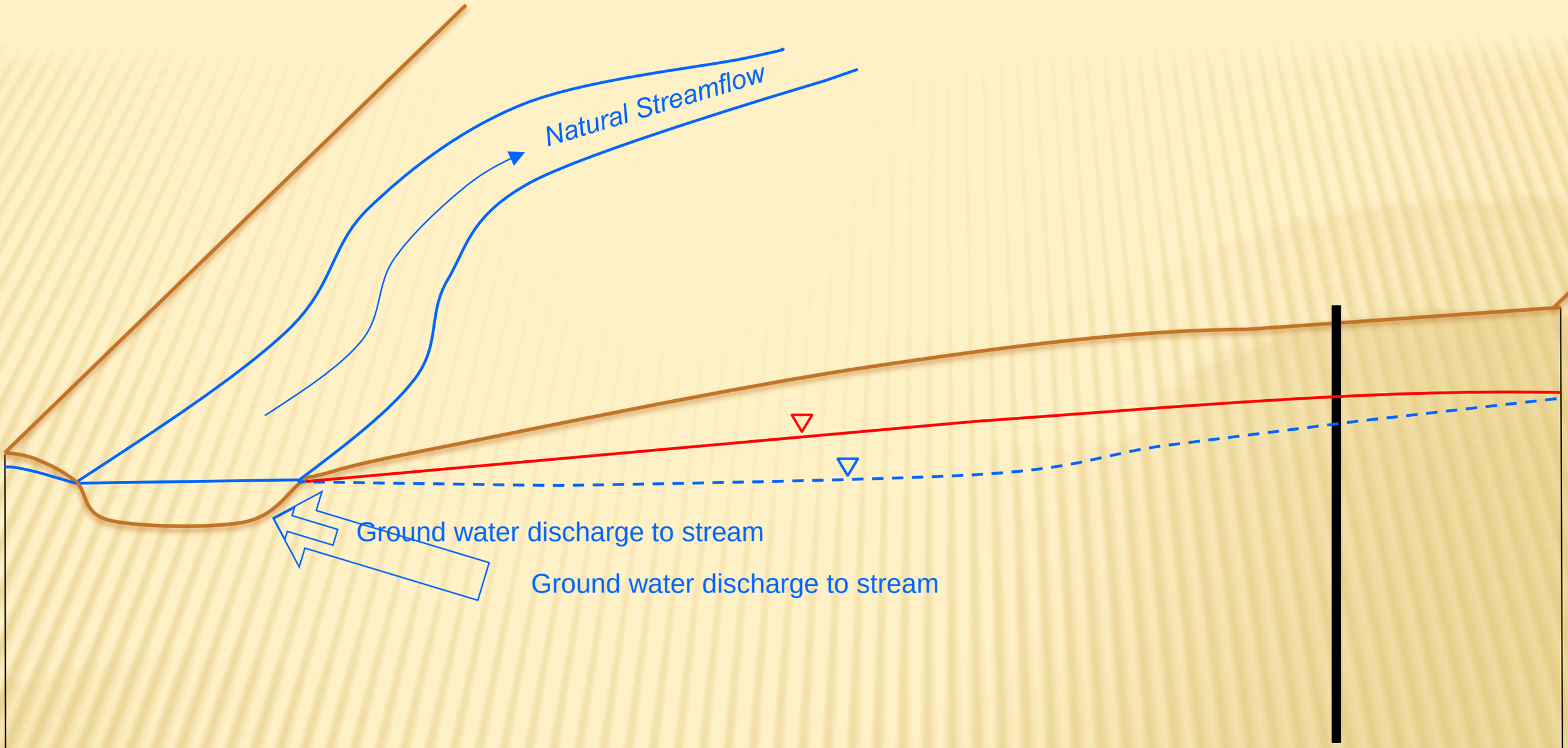
- Pumping continues



Pumping ceases.

- the aquifer begins to recover near the well,
- but total depletive effect on the aquifer remains,

The aquifer is depleted compared to its state had there been no pumping.

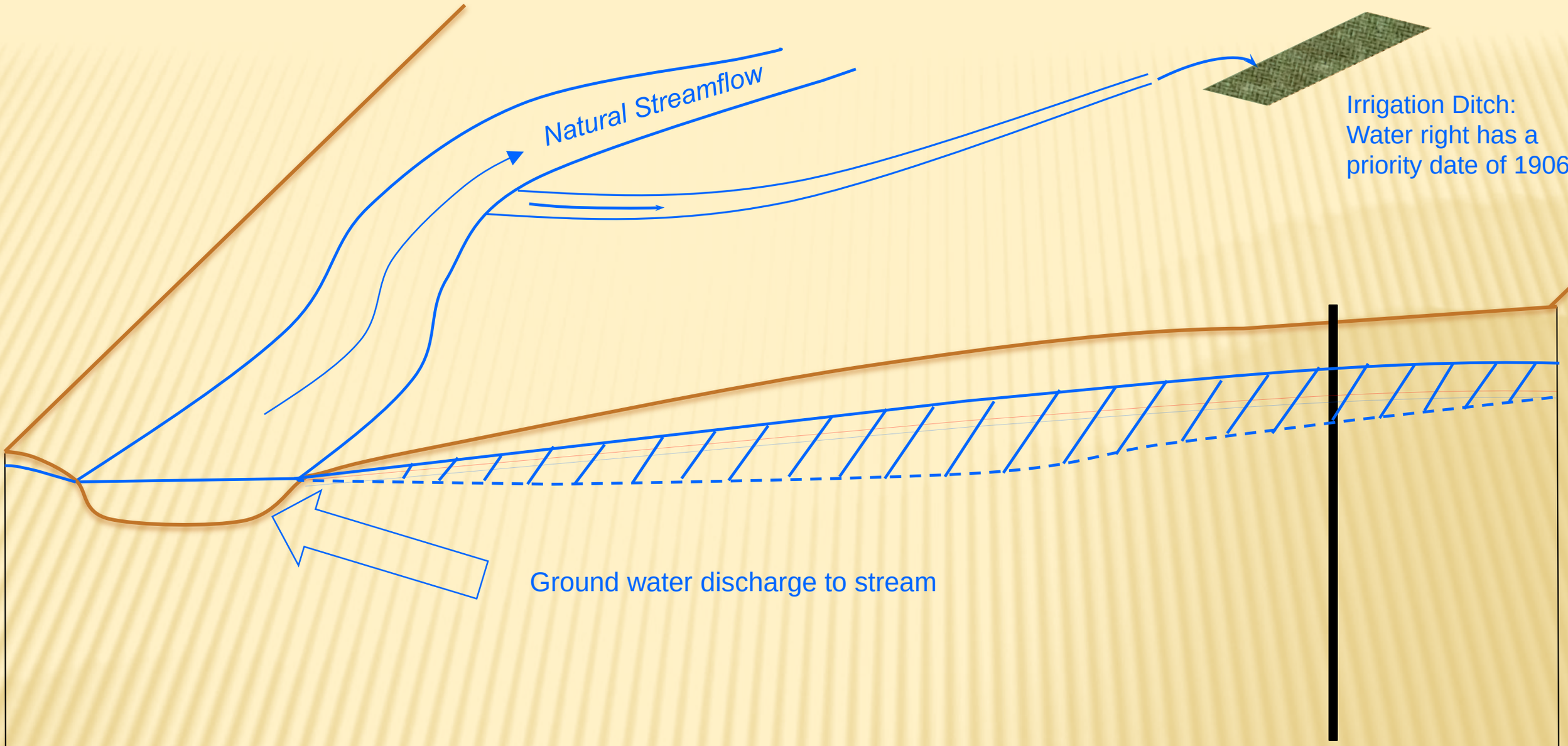


Hydraulic gradient is reduced,

discharge to the stream is reduced,

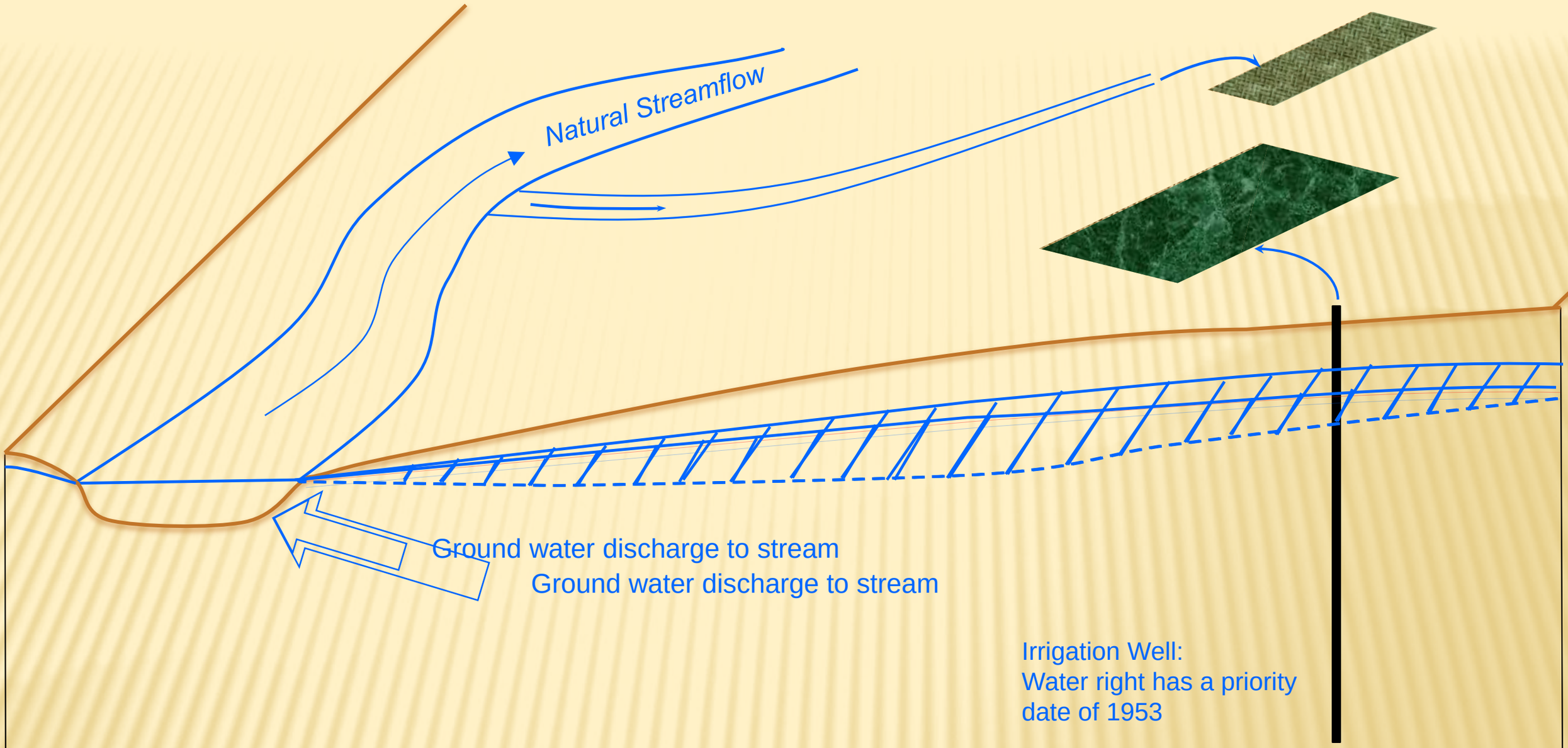
Material injury to surface water rights.

Importance of Augmentation



Since the stream is severely over-appropriated, most years there is not enough streamflow to satisfy all water rights. Example: irrigation ditch with a 1906 priority.

The ditch's water right is satisfied. It benefits from both the natural stream flow and the ground water contribution.



The well with a 1953 priority also diverts water.

Water table is lowered, ground water discharge is reduced.

The ditch with the 1906 water right sees the reduction. Material injury.

We could simply say that the well cannot divert.

Plan for Augmentation

- In plain language

  Augmentation Plan is a plan to replace induced stream depletions using a substitute supply of water

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Plan for Augmentation

- Approved by Water Court
  - Application process
  - Notice through court resume
  - Must address injury
    - Surface water depletions
    - Replacement supply
    - Administrable
- Open participation
- May be litigated
- Final decree from the court

Surface Water Depletion

- Determining the effect
  - Time; when does the depletive effect occur at the stream,
  - Location; where on the stream, relative to vested water rights, does the depletive effect occur,
  - Amount; for the time increment, at the location, what is the volume (or rate) of the depletion.

…what about the timing of impacts

Findings of Fact, Case Nos. W-7209, et al (South Platte Rules), March 15, 1974

(Paragraph 11) “Because of the time lag between a ground water diversion and its impact on surface water users, conditions may arise such that a potential injury to surface diverts (sic) may not actually occur, but the burden of assuring that there will be no injury to the senior appropriator must fall on the junior appropriator.”

Replacing Depletions

- Potential Sources [stored or direct]
  - Leased or purchased irrigation water (surface water)
    - Must be changed, public process
  - Municipal lease/purchase (industrial uses)
    - Raw or treated water
    - Effluent
  - New diversion, in priority
  - Tributary ground water (inherent obligation)
  - Nontributary ground water

Augmentation Plan Variables/Issues

- Hydrogeology
  - Alluvial aquifers with some homogeneity – more straightforward
  - Bedrock systems – greater effort
    - Fractured granite, other geologic formations – more complex, often cannot be modeled

Augmentation Plan Variables/Issues

- Approach
  - Individual plans – large entities, municipalities
  - Special districts – cooperative effort between well owners, economies of scale
  - Homeowner's associations, umbrella augmentation plans – covers large groups, provides for future wells

Questions

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